

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**

(12) UK Patent Application (19) GB (11) 2 289 436 (13) A

(43) Date of A Publication 22.11.1995

(21) Application No 9509992.5

(22) Date of Filing 17.05.1995

(30) Priority Data

(31) 9410032 (32) 19.05.1994 (33) GB

(71) Applicant(s)

Garrard Europe Limited

(Incorporated in the United Kingdom)

32a Brownfields, WELWYN GARDEN CITY, Herts,
AL7 1AN, United Kingdom

(72) Inventor(s)

Desmond Charles Dunne

(74) Agent and/or Address for Service

F J Cleveland & Co
40-43 Chancery Lane, LONDON, WC2A 1JQ,
United Kingdom

(51) INT CL⁶

B32B 7/06 27/04, E04D 5/10

(52) UK CL (Edition N)

B5N N0706 N1704 N175 N176 N178 N181 N182 N195
N196 N199 N20Y N206 N207 N21X N21Y N210 N211
N222 N223 N224 N225 N226 N23X N23Y N237 N238
N244 N247 N248 N255 N256 N257 N258 N259 N26X
N2704 N2720 N2732 N2734 N2736 N282 N284 N295
N296 N297 N398 N401 N402 N408 N409 N46X N466
N467 N474 N475 N477 N478 N489 N501 N502 N564
N570 N575 N58X N58Y N593 N62X N62Y N643 N644
N70X N703 N728 N729 N735 N757 N758 N76X N760
N763
U1S S1708 S1807 S3025

(56) Documents Cited

GB 2243111 A GB 1198316 A US 5166007 A

(58) Field of Search

UK CL (Edition N) B5N
INT CL⁶ B32B 7/06 17/04 27/04, E04D 5/10
ONLINE:WPI,CLAIMS

(54) Curable plastic sheet material

(57) A flexible ultra-violet curable plastics sheet material for covering or repair purposes has a UV upper barrier layer (13) to prevent premature hardening of the resin. The sheet material may comprise a layer (11) of chopped glass fibre and a layer (10) of glass fibre tissue and at least one outer protective sheet (12). The sheet material may be carried by a support sheet (14) with an adhesive coating on each surface.

FIG. 1

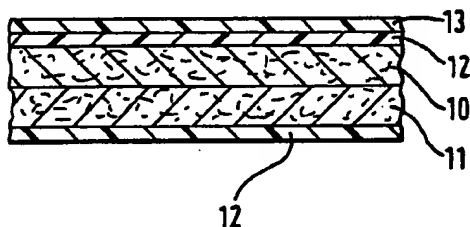
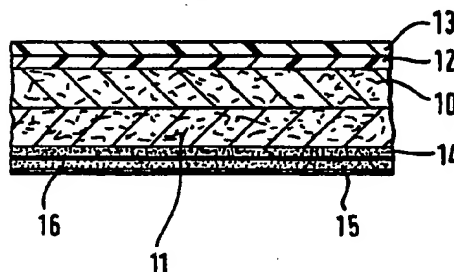


FIG. 2



1 / 1

FIG. 1

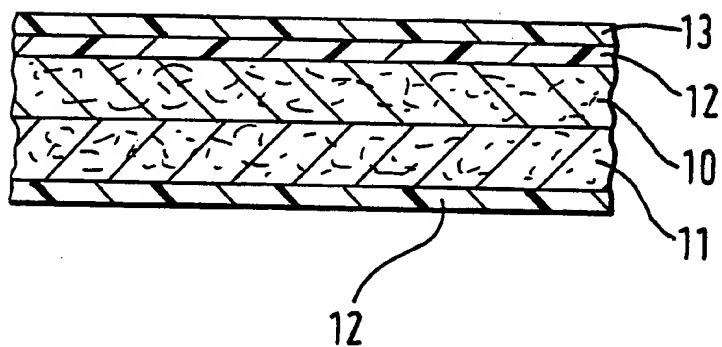
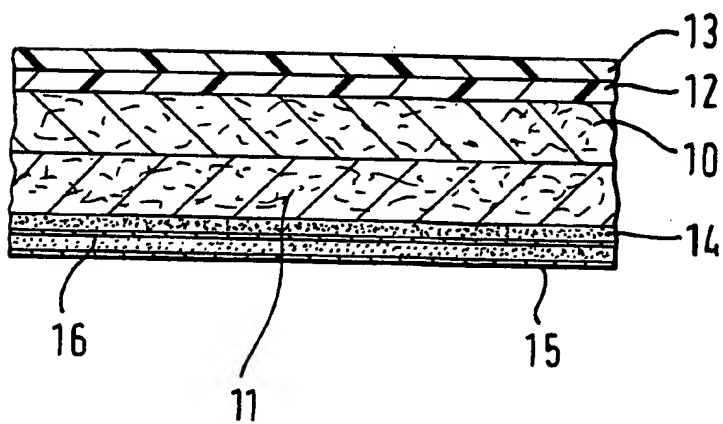


FIG. 2



"Curable Plastic Sheet Material"

This invention relates to a flexible plastics-based sheet material curable to solid of the type set out in GB
5 2,243,111B, hereinafter referred to as the earlier Patent. The invention is however applicable to other plastics-based material which cure under UV radiation, ambient or applied.

10 It will be convenient to describe the invention as applied to the material of the earlier Patent wherein a curable plastic sheet material is characterised in that at least one layer of fibrous reinforcing material is laminated with a support layer of tissue, both layers
15 being impregnated with a curable polymer including a radiation sensitive curing catalyst, the interstices of the tissue layer being sufficiently small such that on curing, the sheet material will be substantially water impermeable. The impregnated layers are sandwiched
20 between outer removable protective layers. The disclosure of this earlier Patent Specification is incorporated into the present application by way of reference.

The invention is concerned with controlling the curing
25 by UV radiation of the material when applied to a surface in use. Particularly when the material in accordance

with the earlier Patent is used out-of-doors a too rapid curing may cause difficulties in application.

In accordance with the present invention there is
5 provided a flexible sheet material based on a polymer composition which cures or sets to a solid state when subjected to ambient or applied UV radiation, said material having at least one removable outer surface layer constituting a UV barrier, so that the flexible
10 material may conveniently be applied to a surface to be covered without premature curing due to ambient UV radiation, the UV barrier subsequently being removed to allow desired and controlled curing to take place.

15 In accordance with another aspect the material is carried by a double-sided adhesive sheet or tape. The outer adhesive surface of the material as supplied to a user will be covered by a masking tape.

20 The user of the material peels off the masking tape or piece and adheres the curable material in accordance with the invention to the surface which it is desired to cover for repair or other purposes. By making the material inherently adhesive the need for laying up with
25 separately applied resin adhesive is avoided and the material in accordance with this development of the

invention is particularly suitable for the non-professional D.I.Y. user. The material having been applied, using its self-adhesive properties, is caused or allowed to cure solid as set out in the earlier
5 Patent.

It will be appreciated that the material in accordance with the invention with the UV barrier will be particularly suitable for out- door general purpose use
10 particularly in hot countries or locations with high UV radiation levels. To avoid premature curing during transport and storage a UV barrier may substantially completely cover both surfaces of the material.

15 The invention will now be described by way of example and with reference to the accompanying drawings wherein:-

Figure 1 is a diagrammatic sectional view of flexible sheet material in accordance with a first embodiment of
20 the invention and,

Figure 2 is a similar view of material in accordance with a second embodiment of the invention.

25 The invention will be described with general reference to the material of the earlier Patent No. 2,243,111B and

the material illustrated is in accordance with that Patent, developed in accordance with the present invention.

5 Thus briefly stated and in accordance with the earlier
 Patent the material of Figure 1 comprises layers 11 and
 10 based respectively on chopped fibre glass fibres and
 glass fibre tissue, each layer impregnated with a curable
 polymer composition. The layers 10 and 11 are initially
10 sandwiched between protective sheets 12 of nylon or
 similar which sheets also serve to facilitate the
 production process. This material and its manufacture
 are fully described in the earlier Patent Specification.

15 In accordance with the present invention and as
 illustrated at least that outer sheet 12 which is to be
 uppermost in use is substantially completely covered by
 a UV barrier sheet or film 13 of black plastics or
 functional equivalent. The barrier 13 in the embodiment
20 being described is of Low Density Polyethylene blended
 during manufacture, or mixed in the extrusion melt, with
 sufficient carbon black to render it black and
 substantially opaque to UV radiation. Additives other
 than carbon black which prevent or reduce UV radiation
25 transmission may be used. The barrier 13 is adhered to
 the layer 10 with an adhesive such as to allow it to be

stripped off without removing sheet 12 when the covering process described in the earlier Patent is completed but prior to curing. The barrier 13 ensures that premature UV curing and resultant stiffening does not take place until the material has been applied. Curing during transport and storage is also substantially prevented and a sheet material in accordance with the present invention is particularly useful in hot countries or locations with high UV radiation levels.

10

In such environments both surfaces of the sheet material may with advantage be covered by a UV barrier layer 13. A further desirable development of the invention is to provide the protective sheets 12 which, as described in the earlier Patent, form an integral part of the production process with UV barrier properties by suitable impregnation or other treatment. With such a development the need for the separate UV barrier layers 13 could be avoided.

20

The embodiment described above has the barrier layers formed of Low Density Polythene though, of course, other known UV barriers, metal films, paper etc., could be used.

25

Turning to the second embodiment of the invention Figure

2 shows schematically and in section a curable sheet material of Figure 1 with a UV barrier layer on the front surface. The rear protective sheet 12 has, however, been removed and replaced by a double sided adhesive piece 14 to enable the piece to be adhered to the surface to be covered. The material as a whole thus has the rear adhesive surface covered by a masking sheet 15 which is peeled off prior to use. The front surface of 14 adheres by its own properties to the tacky resin impregnating 11 till the latter cures enhancing the bond.

The material shown in Figure 2 will usually be supplied as a relatively narrow strip on a reel the masking piece or strip 15 serving as a release allowing the strip to be dispersed from the reel. The end user of the material peels off the masking strip and adheres the material in accordance with the invention to the surface which it is desired to cover for repair or lining purposes. By making the material inherently adhesive the need for laying up with separately applied resins similar to or compatible with that which impregnates the curable layer is avoided. The material having been applied using its self-adhesive properties is caused or allowed to cure solid.

25

As illustrated the adhesive layer is a double sided

adhesive tape with a thin polyester carrier 16 coated on both sides with an acrylic contact adhesive. In a development of the invention the adhesive layer is integral and self-supporting, the carrier layer 16 being
5 omitted.

The present invention envisages as an alternative and different aspect the material of Figure 2 without the UV barrier layer.

10

The drawings, as previously stated, are diagrammatic and much enlarged. Typically material in accordance with the invention will be between 1.2 and 2.5 mm in thickness.

15 The material in accordance with the invention finds application, amongst other things, in roofing and repair work and particularly in the lining of tanks for water and other liquids.

CLAIMS:-

1. Flexible sheet material based on a polymer composition which cures or sets to a solid state when
5 subjected to ambient or applied UV radiation, said material having at least one removable outer surface layer constituting a UV barrier, so that the flexible material may conveniently be applied to a surface to be covered without premature curing due to ambient UV
10 radiation, the UV barrier subsequently being removed to allow desired and controlled curing to take place.
2. Flexible sheet material according to Claim 1 having a UV barrier layer at both outer surfaces.
- 15 3. Flexible sheet material according to Claim 1 or Claim 2 carried by a support sheet with an adhesive coating on each surface.
- 20 4. Flexible sheet material according to any preceding claim comprising a layer of chopped fibres, a tissue layer and at least one outer protective sheet.
5. Flexible sheet material according to Claim 4 and in
25 accordance with any of the claims of G.B. 2,243,111B.

6. Flexible sheet material substantially as described with reference to the accompanying drawings.

7. A method of covering or lining a surface which
5 comprises the step of applying material according to any preceding claim over the entire surface, removing the UV barrier, and causing or allowing the material to cure solid by applied or ambient UV radiation.

Relevant Technical Fields

- (i) UK Cl (Ed.N) B5N
 (ii) Int Cl (Ed.6) B32B 7/06, 27/04, 17/04 E04D 5/10

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE: WPI, CLAIMS

Search Examiner
 R J MIRAMS

Date of completion of Search
 4 JULY 1995

Documents considered relevant
 following a search in respect of
 Claims :-
 1 TO 7

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2243111 A (ELLIOTT)	
X	GB 1198316 A (MINNESOTA MINING) whole document	1, 2, 4, 7
X	US 5166007 A (SMITH) whole document	1 to 4 and 7

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).